

# **FIVE-YEAR REVIEW REPORT**

**First Five-Year Review Report  
for  
Utah Power & Light - American Barrel Superfund Site  
Salt Lake City, Utah**

**September 2001**

**Prepared By:**

**REGION VIII  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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Approved by:

Date

*-Signed-*

*September 26, 2001*

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## **List of Acronyms**

ABY	American Barrel Yard
ARARS	Applicable or Relevant and Appropriate Requirements
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
GAC	Granular Activated Carbon
GRPCMP	Groundwater Restoration Performance and Compliance Monitoring Plan
HASP	Health and Safety Plan
LNAPL	Light Non-aqueous Phase Liquid
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Units
POTW	Publicly Owned Treatment Works
PRP	Potentially Responsible Party
PTS	Principal Threat Source
RALs	Risk Action Levels
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SEA	Southeast Yard
SSC	Superfund State Contract
SVE	Soil Vapor Extraction
UDEQ	Utah Department of Environmental Quality
VOCs	Volatile Organic Compounds

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## **Executive Summary**

EPA Region 8 has conducted the first five-year review of the remedial actions implemented at the Utah Power & Light - American Barrel Superfund Site (Site) located in Salt Lake City, Utah. The review was conducted from June through September 2001. The results of the five-year review indicate that the remedy is expected to be protective of human health and the environment, and immediate threats have been addressed. Overall, the Soil Vapor Extraction (SVE) and depression well system is operating and functioning as designed. Stringent institutional controls are in place to restrict use of the contaminated groundwater and the residents and businesses in the area are connected to the municipal water system. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD.

A few deficiencies that do not immediately impact the protectiveness of the remedy were identified. Quarterly reporting is deficient in that more data interpretation is needed and the calculation of total mass (of benzene and total organics) removed needs to be changed for more accuracy.

Limited biosparging is planned for the cleaner areas of the Site. Preliminary results from pilot tests look promising, but a report on the findings has yet to be received. The groundwater monitoring plan will need to be reevaluated to ensure that an appropriate monitoring scheme is in place to identify and measure any possible effects from biosparging, if fully implemented.

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## Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Utah Power & Light - American Barrel Superfund Site		
EPA ID (from WasteLAN): UTD980667240		
Region: 8	State: UT	City/County: Salt Lake City, Utah
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: September 30, 1996	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Reviewing agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Armando Saenz		
Author title: Remedial Project Manager	Author affiliation: EPA Region 8	
Review period: June 2001 to September 2001		
Date(s) of site inspection: September 19, 2001		
Type of review: <input type="checkbox"/> Statutory <input checked="" type="checkbox"/> Policy ( <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-Sara <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input checked="" type="checkbox"/> 1(first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU # ____ <input type="checkbox"/> Actual RA Start at OU# ____ <input checked="" type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify) _____		
Triggering action date (from WasteLAN): 9/30/96		
Due date (five years after triggering action date): 9/30/01		

## **Five-Year Review Summary Form**

### **Deficiencies:**

Four deficiencies were identified:

- Quarterly reporting lacks summary of historical sampling results for wells and sufficient data interpretation.
- Calculation of total mass (of benzene and total organics) removed in quarterly reports does not accurately reflect amount.
- Report on biosparging pilot test findings has not been received. The report will be used to determine full-scale implementation of the biosparging enhancement.
- Groundwater monitoring plan, after receipt of the biosparging report, will need to be reevaluated to ensure that an appropriate monitoring scheme is in place to identify and measure any possible effects from biosparging, if fully implemented.

These deficiencies do not immediately impact the protectiveness of the remedy.

### **Recommendations and Follow-up Actions:**

With EPA oversight, the corresponding recommendations/follow-up actions are as follows:

- PacifiCorp will need to include historical well sampling data and more data interpretation in quarterly reports beginning with the Fourth Quarter 2001 report.
- PacifiCorp will need to include recalculations of total mass in quarterly reports beginning with the Fourth Quarter 2001 report.
- PacifiCorp will need to send report on pilot test findings to EPA and UDEQ by end of September 2001.
- PacifiCorp will need to reevaluate the groundwater monitoring plan by the end of October 2001 to ensure that an appropriate monitoring scheme is in place to identify and measure any possible effects from the biosparging, if fully implemented.

### **Protectiveness Statement(s):**

The remedy at the UP&L/American Barrel Superfund Site is expected to be protective of human health and the environment, and immediate threats have been addressed. The SVE and depression well system is operating and functioning as designed. Stringent institutional controls are in place to restrict use of the contaminated groundwater and the residents and businesses in the area are connected to the municipal water system. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD.

## **Utah Power & Light - American Barrel Superfund Site First Five-Year Review Report**

### **I. Introduction**

EPA Region 8 has conducted a five-year review of the remedial actions implemented at the Utah Power & Light - American Barrel Superfund Site (i.e. Site) located in Salt Lake City, Utah. This review was conducted from June through September 2001. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is conducted as matter of EPA policy. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP [Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR)] states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the first five-year review for the Site. The triggering action for this review is the completion of the remedial actions (i.e. construction completion) on September 30, 1996. Due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure, another five-year review is required.

## **II. Site Chronology**

**1870's - 1987:** Activities, at the Site, during this period included coal gasification, creosote pole treating operations and drum storage.

**1987 - 1988:** Preliminary Assessment/Site Investigation conducted at the Site.

**October 4, 1989:** Site listed on the National Priorities List.

**1993:** Remedial Investigation/Feasibility Study completed for Site.

**July 7, 1993:** Record of Decision signed for Site.

**April 1995 - August 1996:** Remedial action conducted.

**September 30, 1996:** Preliminary Close Out Report (i.e. Construction Completion).

**June - August 2001:** Five-year review conducted.

## **III. Background**

The Site is located on an approximately four-acre parcel just west of the downtown area in Salt Lake City. It is divided into two main study areas, identified as the American Barrel Yard (ABY) and the Southeast Area (SEA). The ABY area is located between two railroad tracks owned by separate rail companies and the SEA area is a triangular area south of the eastern railroad tracks and is owned by a third railroad company. A residential area exists 200 feet directly west of the railroad tracks and the Site. See Figure 1.

Activities at the Site began in the 1870's and continued until 1987 when a preliminary assessment was conducted. The activities at the Site included coal gasification, creosote pole treating operations and drum storage. Coal gasification activities were conducted on the ABY and SEA until the early 1900's. By-products of the gasification process included tars, sludges, coke, toluene, naphthalene, anthracene, phenols, ash and liquid wastes.

Creosote pole treating operations were also conducted at both the ABY and SEA areas of the Site. Although specific chemical composition of the creosote used at the Site is unknown, typical creosote compounds include polynuclear aromatic hydrocarbons (PAHs) and phenolic compounds. The ABY was also used as a storage yard for used and empty 55-gallon drums. Although the drums were supposed to be empty, residual contents are believed to have included solvents, resins, paints, paint removers, pesticides, gasoline and acetone. Evidence of leakage from the drums was prevalent throughout the ABY. The barrels were removed in 1988.



Through two site investigations and the remedial investigation of the Site, EPA identified high levels of PAHs, heavy metals, pesticides and petroleum hydrocarbon constituents in the soils and benzene, toluene, ethyl benzene and xylene (BTEX) in the surface and subsurface soils and shallow groundwater.

The Site was listed on the National Priorities List on October 4, 1989. The contaminants at the Site posed the greatest risks to human health through direct contact with the soils and contaminants themselves since the Site was immediately adjacent to a residential area and was frequented by transients. Groundwater also posed a threat due to the potential for contamination of the deeper aquifer which is used as a drinking water source in Salt Lake City.

#### **IV. Remedial Actions**

##### **Remedy Selection**

The Record of Decision (ROD) for the Site was signed on July 7, 1993. The ROD provided that response actions will permanently address all principal threats through treatment. Soil contamination will be reduced to health based levels for all contaminants of concern. These levels are based on a worker exposure scenario and set at the more protective end of the risk range. Soils cleaned up at these levels will not pose unacceptable risks for future residential development, if long term use of the Site changes. Groundwater remediation levels are based on the Safe Drinking Water Act maximum contaminant levels. The following are the major components of the remedy as described in the ROD:

- Excavation of soils which are principal threats based on visual observation and confirmed by sampling to the extent possible, given physical limitations resulting from locations of existing railroad lines.
- Excavation of soils exceeding health based remediation levels, based on a  $10^6$  worker exposure pathway. Soils down to a depth of 10 feet are considered to have an exposure pathway.
- Treatment of excavated soils through offsite recycling of soils into a cold mix asphalt product suitable for paving roads. Incorporation of contaminated soils as a raw material into the asphalt product involves treatment through solidification.
- If any RCRA characteristic hazardous wastes are encountered, these contaminated soils will be shipped off-site for incineration and will not be utilized in the asphalt treatment process.
- Soil vapor extraction (SVE) will be used to remediate principal threat light non-aqueous

phase liquid (LNAPL) contamination. Location of the SVE extraction wells will be based on a principal threat definition where benzene in soils exceeds  $10^{-3}$  risk levels for residential exposure to groundwater. In conjunction with SVE, groundwater will be extracted from vapor extraction wells to enhance the SVE process. Off-gas from the SVE system will be treated prior to discharge to the atmosphere.

- Groundwater extracted from SVE wells, water pumped from excavations and decontamination water will be treated to Publically Owned Treatment Works (POTW) discharge standards and then discharged to the Salt Lake City POTW for further treatment.
- The dissolved phase aqueous groundwater contamination plume is expected to naturally attenuate once the principal threat sources for groundwater contamination are remediated. If monitoring of groundwater contamination indicates that natural attenuation is not restoring groundwater to remediation levels, additional source removal or more active groundwater remediation may be required.
- A deed notice shall be placed on the chain of title to the UP&L property and Denver and Rio Grande Western property disclosing the presence of contaminated soils below a depth of 10 feet on those properties and the presence of contaminated groundwater, and shall prohibit the drilling of any water wells. Any excavation of this material will require handling in accordance with all applicable regulations.
- Institutional controls that prevent exposure to contaminated groundwater shall be implemented. The Potentially Responsible Parties (PRPs), together with EPA and Utah Department of Environmental Quality (UDEQ), shall inform the State Engineer for the Division of Water Rights, Utah Department of Natural Resources of the potential risks associated with the use of groundwater from the Site.

## **Remedy Implementation**

Under a Consent Decree (Civil #94-C-1162W) entered in April 1995, the remedial action construction was conducted by the PRP, PacifiCorp, in two phases. Phase I included soil excavation, construction of the temporary groundwater treatment facility and groundwater monitoring well installation and repair. Phase II included construction of the SVE treatment system.

Construction of Phase I began in April 1995 with well installation and site preparation activities. Excavation activities began with the removal of surface soils in May 1995 and proceeded with excavation of principal threat wastes throughout the Summer and early Fall. By the end of November, backfilling with clean soil in all excavated areas was complete. Installation of the SVE wells (part of Phase II) began in September 1995 after excavation, but prior to backfilling. Construction of the SVE treatment facility began in May 1996 and was complete in June 1996.

A pre-final inspection of the construction activities was conducted on June 26, 1996, along with the start-up of the SVE treatment plant. A list of minor outstanding construction items was developed which the PRP fully addressed by the final inspection on August 29, 1996. By the final inspection, the SVE treatment facility was fully operational and functional. The Site achieved construction completion status when the Preliminary Close Out Report was signed on September 30, 1996.

Deed notices have been placed on the chains of title to the UP&L (i.e. PacifiCorp) and the Denver and Rio Grande Western properties. The deed notices disclose the presence of contaminated soils below a depth of ten feet, the presence of contaminated groundwater and prohibiting the drilling of any water wells.

There was no need to notify the State Engineer's Office of the potential risks associated with the use of groundwater from the Site because there were already institutional controls to protect nearby residents/businesses from the contaminated groundwater. Salt Lake City Ordinance #17.16.510 requires connection to a public water system, if a public water main is available within city limits. Also, under Section II of the *Salt Lake Valley Interim Ground-water Management Plan*, well applications will not be granted in areas where a public water system is available. Nearby residents and businesses are all connected to the municipal water system.

## **System Operations**

The system at the Site includes SVE with groundwater depression wells to allow the entire vadose and smear zones to be remediated. The system consists of a network of six vaults located on the Site that connect to 39 horizontal and 11 vertical SVE wells. The vaults are manifolded into the treatment building where extracted vapors are treated using carbon adsorption units and the groundwater extracted from the depression wells is treated in a UV-Oxidation Unit. The system has been operating continuously from July 1996 to the present with minor shutdowns due to power outages, maintenance and repair. See Figure 2.

**Air Monitoring.** Air monitoring is performed on a monthly basis at the Site. After start-up, both the influent and effluent air samples were taken from the SVE treatment system and analyzed. Benzene concentrations in the influent air were low enough that on March 26, 1997, the Utah Division of Air Quality determined that there was no need to run the influent air through the carbon units to reach air permitting discharge requirements. However, the influent air still runs through the carbon units before being discharged as an additional safety precaution. Because of the low influent benzene concentration, the monthly monitoring only includes the influent air.

A weekly summary of total flow, average flow, total benzene removed and total organic compounds removed from the subsurface by the SVE system is presented in quarterly reports. The total mass of benzene and total organic compounds in the soil vapor removed from the subsurface by the SVE system are calculated by multiplying the influent benzene or total organic compounds concentration by the total SVE flow.





**Groundwater Depression Monitoring.** Influent and effluent sampling is conducted on a quarterly basis. Since the groundwater leaving the treatment system has been consistently below POTW standards, the POTW changed its effluent sampling frequency to the minimum allowable of twice a year in October 1998.

A weekly summary of total flow, average flow, total benzene removed and total organic compounds removed from the subsurface by the groundwater extraction and treatment system is presented in quarterly reports. The total mass of benzene and total organic compounds in groundwater extracted by the groundwater extraction and treatment system are calculated by multiplying the benzene or total organic compounds concentration by the total effluent flow.

### **Groundwater Monitoring**

Monitoring for the groundwater (which flows from east to west across the Site) has taken place quarterly from December 19, 1995 to the present. Currently, eight monitoring wells are sampled to evaluate the effectiveness of past and current remedial activities to reduce contaminant levels. The SVE and depression well system is shut down prior to sampling to allow for groundwater recharge and to ensure representative samples from all wells. The principal threat source (PTS) wells RW002, RW003, RW301 and RW509 are sampled for VOCs, Semi-VOCs and Cyanide. Boundary wells RW505, RW506, RW522 and RW530 are sampled for BTEX and Cyanide for three of the four quarters. RW505 is analyzed for Nitrogen, Nitrate each quarter. Every June, the boundary wells are sampled for VOCs and Semi-VOCs. Also, during the second quarter both PTS and boundary wells are sampled for Cyanide. See Figure 3.

### **Limited Biosparging Enhancement**

In a document titled *Five Year Review* dated July 1999, Pacificorp proposed minor modifications to the operation of the remedy based on sampling results conducted in 1998. The document presented sampling results that identified the heavily contaminated areas and the cleaner areas of the Site. It suggested that the cleaner areas had begun to reach an asymptotic state and were more conducive to a less aggressive remedial approach. A model, presented in the document, also showed the organic plume was stable and estimated that the plume, upon source removal, would be removed in five years. In addition, the model suggested that the plume would degrade faster if more dissolved oxygen was available for biodegradation. The proposed remedial approach to “polish” the cleaner areas was biosparging.

Because of the information in the document and because biosparging is commonly used with SVE to successfully clean up sites throughout the industry, EPA approved the biosparging enhancement on a conceptual basis on June 8, 2000 and the design on October 27, 2000.

The biosparging with SVE will be limited to the cleaner areas around Vaults 1, 2 and 3. Groundwater depression in these vaults will no longer be an active part of the cleanup. SVE will continue in the other areas and groundwater will be monitored for any possible effects from the



biosparging such as plume expansion beyond the current boundary.

Implementation will require minor modifications. Existing SVE wells will be retrofitted to biosparging wells by setting the pneumatic pumps higher above the water and using the line from the pumps to inject air into the wells. This retrofitting allows the wells to be easily switched back to the original configuration, if deemed necessary.

## **Quarterly Reports**

Quarterly reports are required by Section XI of the Consent Decree. The reports summarize the following:

- Quarterly compliance groundwater sampling and analytical results.
- System operations, performance and analytical results.
- Maintenance of system.
- Biosparging enhancement to the system.

The report and associated activities are in compliance with the revised *Groundwater Restoration Performance and Compliance Monitoring Plan* dated August 26, 1997 and the *Operation and Maintenance Plan* dated July 1996.

## **V. Five-Year Review Process**

The UP&L - American Barrel Superfund Site Five-year Review was led by Armando Saenz, Remedial Project Manager for the Site. The following team members assisted in the review:

- Doug Compton, UDEQ Project Manager
- Andy Lensink, EPA Attorney
- Nancy Mueller, EPA Community Involvement Coordinator

The five-year review consisted of the following activities: a review of relevant documents; interviews with representatives of the Potentially Responsible Party (PacifiCorp) and UDEQ; review of ARARS and O&M data; and, site visits. A notice stating that the five-year review was in progress and requesting public input was placed in The Salt Lake Tribune. No comments from the public were received. The notice of completion of the five-year report will also be placed in The Salt Lake Tribune.

## **VI. Five Year Review Findings**

### **Interviews**

The following individuals were contacted by telephone by Armando Saenz as part of the five-year review:

- Jeff Tucker, Project Manager, PacifiCorp (Interviewed 7/26/01)
- Doug Compton, Project Manager, UDEQ (Interviewed 7/30/01)

**Jeff Tucker.** Mr. Tucker stated that he is not aware of any major issues related to the operations at the Site. Because of the chain-link fence with barbed wire, transients rarely trespass on the Site. The fence occasionally needs to be fixed and the weeds are regularly mowed. He mentioned that the vault cover for Vault 4 may need to be replaced due to damage by a fire truck responding to a recent fire caused by sparks from a train on the railroad adjacent to Vault 4. He also mentioned that there has been little to no public interest in the Site.

Mr. Tucker stated that the Health & Safety and Contingency Plans are located at the Site, along with the O&M Manuals. He remembered placing a deed notice on the chain of title to the UP&L (i.e. PacifiCorp) property in 1995. (Note: These activities were subsequently verified via documentation).

**Doug Compton.** Mr. Compton has been the UDEQ Project Manager for the Site for one and half years and has gone to the Site a number of times to oversee the activities at the Site, namely O&M of the system, groundwater sampling and the pilot tests. Although the SVE and depression well system is complex, he believes that PacifiCorp has done an excellent job operating and maintaining the system due to their proactive efforts and quick response to problems.

### **Site Inspection**

The Site was inspected on September 19, 2001. The inspection evaluated the SVE/depression well system and monitoring wells. The system appeared to operate as planned and the monitoring wells that were selected were in good condition. Weeds were apparent throughout the Site and the fence on the eastern boundary was slightly damaged - these kinds of problems are routinely addressed on a quarterly basis. No significant O&M problems were encountered.

### **ARARs Review**

As part of the five-year review, State and Federal Applicable and Relevant and Appropriate Requirements (ARARs) were reviewed. The primary purpose of this review was to determine if any newly promulgated or modified requirements of federal and state environmental laws have significantly changed the protectiveness of the remedies implemented at the Site. The ARARs reviewed were those included in the 1993 ROD.

Overall, the review does not indicate any substantive changes to regulations that would affect the remedy (before or after the limited biosparging enhancement) nor its protectiveness. EPA and UDEQ will continue to monitor this Site and any future changes or modifications in ARARs will

be reported in the next five-year review.

## **Data Review**

**SVE and Depression Well System.** The remedy at the Site includes SVE with groundwater depression wells to allow the entire vadose and smear zones to be remediated. The system has been operating continuously from July 1996 to the present with minor shutdowns due to power outages, maintenance and repair.

A review of records and monitoring reports (through the first quarter of 2001) indicates that the SVE and depression well system is being operated and maintained as required by the Consent Decree, revised *Groundwater Restoration Performance and Compliance Monitoring Plan* and the *O&M Plan*. Also, O&M of the various components of the system is conducted in accordance with the site O&M manual and appropriate manufacturer's O&M manuals.

The SVE and groundwater depression well system has been successful. Since system start-up in 1996 through April 1, 2001, SVE has removed an estimated 14.06 pounds of benzene and 45.05 pounds of total organic compounds from the Site. The groundwater depression wells have removed 113.70 pounds of benzene and 432.65 pounds of total organic compounds. The following is an analysis of the data through April 1, 2001:

**Air Monitoring.** Air monitoring is performed on a monthly basis at the Site. After start-up, both influent and effluent air samples were taken from the SVE system and analyzed. Benzene concentrations in the influent air were low enough that on March 26, 1997, the Utah Division of Air Quality determined that there was no need to run the influent air through the carbon units to reach air permitting discharge requirements. However, the influent air still runs through the carbon units before being discharged as an additional safety precaution. Because of the low influent benzene concentration, monthly monitoring only includes the influent air.

Air monitoring has shown that, over time, there has been a definitive downward trend in the benzene vapor concentrations (See Figure 4). The benzene concentration started at 550 parts per billion (ppb) on April 24, 1997 and was 9.9 ppb as of February 12, 2001. These data show a benzene reduction of roughly 98% in the subsurface vapors. Oscillations in the results are due to the quarterly system shut down for groundwater sampling. The two week shutdowns result in a flushing of the vadose zone by the groundwater. This flushing has been beneficial to the SVE system in that it allows the air to rechannel and pick up contamination in areas of the vadose zone that were previously not reachable.

**Groundwater Depression Monitoring.** The groundwater depression well system has processed 2.43 million gallons of water from start-up through April 1, 2001. Quarterly influent and effluent sampling has demonstrated that benzene concentrations as the influent



water enters the treatment building range between 1,500 to 10,000 micrograms per liter (ug/l) benzene, yet the groundwater consistently leaves the system well below POTW standards. Cyanide concentration in the groundwater is also significantly reduced in the UV system. It enters the treatment building at approximately 1 - 2 mg/l and leaves the treatment system close to method detection limits. Since the groundwater leaving the treatment system has been consistently below POTW standards, the POTW changed its effluent sampling frequency to the minimum allowable of twice a year in October 1998.

**Groundwater Monitoring.** Monitoring for the groundwater (which flows from east to west across the Site) has taken place quarterly from December 19, 1995 to the present. A review of records and monitoring reports (through the first quarter of 2001) indicates that the monitoring activities are in accordance with the Consent Decree, ROD and the revised *Groundwater Restoration Performance and Compliance Monitoring Plan*.

Currently, eight monitoring wells are sampled to evaluate the effectiveness of past and current remedial activities to reduce contaminant levels. The SVE and depression well system is shut down prior to sampling to allow for groundwater recharge and to ensure representative samples from all wells. The principal threat source (PTS) wells RW002, RW003, RW301 and RW509 are sampled for VOCs, Semi-VOCs and Cyanide. Boundary wells RW505, RW506, RW522 and RW530 are sampled for BTEX and Cyanide for three of the four quarters. RW505 is analyzed for Nitrogen, Nitrate each quarter. Every June, the boundary wells are sampled for VOCs and Semi-VOCs. Also, during the second quarter both PTS and boundary wells are sampled for Cyanide. See Figure 3.

**Boundary Wells.** Sampling data for the boundary wells suggests that the remedy has been effective in reducing contaminant levels. Boundary well concentrations of BTEX over time are still non-detect with a few exceptions occurring in 1998, due to laboratory difficulties. As can be seen in Table 1, well RW505 is the only well with cyanide concentrations slightly above the Maximum Contaminant Level (MCL) of .2 mg/l. Figure 5 shows a definite decline in cyanide concentrations in the well which is consistent with expectations at the time of the ROD and the revised *Groundwater Restoration Performance and Compliance Monitoring Plan*. Figure 5 also suggests that the cyanide concentration will be below the MCL within two years.

Although the current cyanide concentration in boundary well RW505 is slightly above the MCL, the risk to the immediate area is minimal. Stringent institutional controls, described on page 6, are in place to restrict the use of well water. In addition, the major forms of cyanide at the Site are iron cyanide complexes. Groundwater containing iron cyanide complexes is not toxic unless the groundwater is removed from the subsurface and a significant amount of complexed cyanide undergoes photolysis and produces free cyanide. Free cyanide forms the basis of risk. Even if photolysis were to occur, it does not necessarily follow that toxic levels of cyanide will be available because many factors influence the concentration of free cyanide.







**PTS Wells.** The concentrations for the Contaminants of Concerns (COCs) for the PTS wells remain constant or are decreasing, depending on the constituent and the well. The COCs and their respective remediation levels are listed in Table 2. Tables 3, 4, 5 and 6 summarize the COC concentrations for PTS wells RW002, RW003, RW301 and RW509, respectively. Most of the COCs in the PTS wells are now either non-detect or below MCL. The exceptions include benzene, cyanide and most of the contaminants in PTS well RW002.

The more contaminated wells RW002 and RW003 are located in the cluster of wells in the middle of the Site. RW301 is also located in the cluster, but screened at a deeper, less contaminated interval. RW509 is located in the South East Area (SEA). See Figure 3.

Benzene concentrations were graphed for the PTS monitoring wells (See Figures 6 to 9). Figure 6 shows that the benzene concentration in RW002 has kept constant at approximately 21,000 ug/l since system start-up. Since the MCL for benzene is 5 ug/l this well is highly contaminated. RW003 also has kept constant averaging 465 ug/l as shown in Figure 7. Benzene concentrations have not significantly declined for the two wells because low pumping rates are prevalent in the surrounding area. However, implementing biosparging (with SVE) on-site may allow for increased groundwater extraction in Vaults 4, 5 and 6 which are in the area of monitoring wells RW002 and RW003.

RW301's benzene concentration has generally decreased over time and was close to the MCL before dramatically increasing in the September 2000 sampling event and then dramatically decreasing in the 2001 events (See Figure 8). It appears that the samples in the latter part of 2000 were pulling free product which is expected from time to time at this Site. Benzene concentrations in RW509 have been near detection limits or non-detect the last eight sampling rounds. Figure 9 shows that in the March 1999 sampling round there was an 800 ug/l increase in benzene concentrations. Most likely, it is an anomaly or lab error.

RW002's and RW003's cyanide concentrations are within 3 mg/l of the MCL of .2 mg/l. RW301 has been consistently below the MCL. RW509 has been consistently close to the MCL, except in the 2001 sampling events. Recent and nearby construction appears to have dried up the well. Currently, there is about 2 inches of water in the well and during the March sampling event, purge volume could not be reached and first water on the second day was sampled. It could be that the cyanide concentration increased with the lack of water or that these recent sampling events were anomalies. See Figures 10 to 13.

**Limited Biosparging Enhancement.** Pilot testing for biosparging was conducted at Vaults 2 and 3 in March and April of this year. The test wells for both vaults showed significant increases in dissolved oxygen. In the area for Vault 2, the area of influence could not be readily obtained since only one well could be measured and it was not downgradient. Wells in the Vault 3 area































responded very well and all showed increases in dissolved oxygen levels within 24 hours of test initiation. A report on the pilot test findings is forthcoming and will be reviewed by EPA and UDEQ.

## VII. Assessment

The following conclusions support the determination that the remedy at the Site is expected to be protective of human health and the environment upon completion.

### *Question A: Is the remedy functioning as intended by the decision documents?*

- **HASP/Contingency Plan:** Both the Health & Safety Plan and the Contingency Plan are in place, sufficient to control risks, and properly implemented.
- **Implementation of Institutional Controls and Other Measures:** Access controls are in place at the Site including a fence and a warning sign. The Site fence is in good condition. Deed notices have been placed on the chains of title to the UP&L (i.e. PacifiCorp) and the Denver and Rio Grande Western properties. The deed notices disclose the presence of contaminated soils below a depth of ten feet, the presence of contaminated groundwater and prohibit the drilling of water wells. There was no need to notify the State Engineer's Office of the potential risks associated with the use of groundwater from the Site because there were already institutional controls to protect nearby residents and businesses from the contaminated groundwater. Salt Lake City Ordinance #17.16.510 requires connection to a public water system, if a public water main is available within city limits. Also, under Section II, number 2, of the *Salt Lake Valley Interim Ground-water Management Plan*, well applications will not be granted in areas where a public water system is available. Nearby residents and businesses are all connected to the municipal water system. There are no current or planned changes in land use at the Site.
- **Remedial Action Performance:** The SVE and depression well system has been operating continuously from July 1996 to the present with minor shutdowns due to power outages, maintenance and repair. Since system start-up through April 1, 2001, SVE has removed an estimated 14.06 pounds of benzene and 45.05 pounds of total organic compounds from the Site. The groundwater depression wells have removed 113.70 pounds of benzene and 432.65 pounds of total organic compounds as of April 2001. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD. Modeling has suggested that the site plume is stable and that it will be cleaned up in approximately five years with source removal and extraction wells. With the biosparging enhancement, the model suggests that the plume would be cleaned up even faster.
- **System Operations/O&M:** O&M activities are being conducted in accordance with all appropriate plans and manuals. System operational procedures are consistent with

requirements. Maintenance issues that have occurred with the SVE and depression well system have been handled properly to date.

- ***Opportunities for Optimization:*** The limited biosparging enhancement proposal appears promising and will be pursued further.
- ***Early Indicators of Potential Remedy Failure:*** No early indicators of potential remedy failure were noted during the review.

***Question B: Are the assumptions made at the time of the remedy selection still valid?***

- ***Changes in Standards:*** No newly promulgated or modified ARARs that would significantly change the protectiveness of the remedies implemented at the Site were found.
- ***Changes in Exposure Pathways:*** No changes in site conditions that affect exposure pathways were identified as part of the five-year review. First, there are no current or planned changes in land use. Second, no new contaminants, sources, or routes of exposure were identified as part of this five-year review. Finally, there is no indication that hydrologic/hydrogeologic conditions are not adequately characterized. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD.
- ***Changes in Toxicity and Other Contaminant Characteristics:*** Changes in toxicity and other factors for contaminants of concern, since the time of the ROD, do not call into question the protectiveness of the remedy.
- ***Changes in Risk Assessment Methodologies:*** Changes in risk assessment methodologies, since the time of the ROD, do not call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?***

No additional information has been identified that would call into question the protectiveness of the remedy.

## **VIII. Deficiencies**

Deficiencies were discovered during the five-year review. None of these are sufficient to warrant a finding of not protective as long as corrective actions are taken. The following are the discovered deficiencies:

1. **Data Interpretation.** Although collected data are included in the quarterly reports, limited interpretation is conducted, particularly in the groundwater sampling and analytical results section. Historical sampling results for indicator chemicals for each well should be provided to facilitate trend analysis.
2. **Total Mass Calculation.** For better accuracy, the total mass removed for benzene and total organic compounds by SVE needs to be recalculated using historical analytical results from the appropriate monitoring periods rather than those from December 1996. This procedure should be followed for all subsequent quarterly reports.
3. **Biosparging Report.** A report on pilot test findings is needed to determine the feasibility of full-scale installation of the biosparging enhancement.
4. **Reevaluation of Monitoring Plan.** The groundwater monitoring plan, after receipt of the biosparging report, should be reevaluated to ensure that an appropriate monitoring scheme is in place to identify and measure any possible effects from the biosparging, such as plume expansion beyond the current boundary.

#### **IX. Recommendations and Follow-up Actions**

With EPA oversight, the corresponding recommendations/follow-up actions are as follows:

1. **Data Interpretation.** PacifiCorp will need to include historical well sampling data and more data interpretation in quarterly reports beginning with the Fourth Quarter 2001 one.
2. **Total Mass Calculation.** PacifiCorp will need to include recalculations of total mass in quarterly reports beginning with the Fourth Quarter 2001 report.
3. **Biosparging Report.** PacifiCorp will need to send the report on pilot test findings to EPA and UDEQ by end of September 2001.
4. **Reevaluation of Monitoring Plan.** PacifiCorp will need to reevaluate the groundwater monitoring plan by the end of October 2001 to ensure that an appropriate monitoring scheme is in place to identify and measure any possible effects from the biosparging, if fully implemented.

#### **X. Protectiveness Statements**

The remedy at the UP&L/American Barrel Superfund Site is expected to be protective of human health and the environment, and immediate threats have been addressed. The SVE and depression well system is operating and functioning as designed. Stringent institutional controls are in place

to restrict use of the contaminated groundwater and the residents and businesses in the area are connected to the municipal water system. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD.

## **XI. Next Review**

This review was conducted as a matter of EPA policy. The next review will be conducted within five years of the completion of this five-year review report. The completion date is the date of the signature shown on the signature cover attached to the front of the report.